

App. Serial No. 10/525,862
Docket No.: NL 020803 US

In the Claims:

Please amend the claims as indicated below. This listing of claims replaces all prior versions.

1. (Cancelled)
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Cancelled)
7. (Currently Amended) A phase locked loop comprising a phase detector for determining a phase difference between a reference signal and relative phase shifted signals to generate frequency control signals the phase detector comprising: means for obtaining a one of said frequency control signals by binary multiplication of the reference signal and one of the relative phase signals; means for obtaining a second one of said frequency control signals by binary multiplication of the relative phase shifted signals; and a frequency detector coupled to receive the reference signal and the relative phase shifted signals for supplying an up frequency detector signal and a down frequency detector signal to a charge pump that is coupled to ~~the~~ a loop filter, wherein the frequency detector comprises a third flip-flop and a fourth flip-flop driven by the reference signal and having at their inputs the relative phase signals, outputs of the third and fourth flip-flops being coupled to input terminals of a fifth flip-flop the phase frequency detector generating the up frequency detector signal obtained by binary multiplication between a signal generated by the fifth flip-flop at ~~its~~ its output and the signal obtained at the bar-output of the fourth flip-flop, and further generating the down frequency detector signal obtained by binary multiplication of the signal obtained at a bar-output of the fourth flip-flop and the signal obtained at a bar-output of the fifth flip-

App. Serial No. 10/525,862
Docket No.: NI. 020803 US

flop signal obtained at the bar-output of the fourth flip-flop.

8. (Cancelled)

9. (Currently Amended) For use in a phase locked loop having a reference signal and relative phase shifted signals, a method for generating frequency control signals used by a first charge pump and an up frequency detector signal and a down frequency detector signal[s] for a second charge pump communicatively coupled to a loop filter, the method comprising:

obtaining one of said frequency control signals by binary multiplication of the reference signal and one of the relative phase signals;

obtaining a second one of said frequency control signals by binary multiplication of the relative phase shifted signals; and

obtaining the up and down frequency detector signals using a first, second and third flip-flop each of the first and second flip-flops communicatively coupled to the reference signal and to a different one of the relative phase shifted signals and [a] the third flip-flop communicatively coupled to ~~the an~~ output of the first flip-flop and ~~the an~~ output of the second flip-flop, wherein the reference signal drives the first and second flip-flops, the relative phase signals drive inputs of the first and second flip-flops, the outputs of the first and second flip-flops being coupled to input terminals of the third flip-flop, the up frequency detector signal is obtained by binary multiplication between a signal generated by the third flip-flop at its output and a signal obtained at the a bar-output of the second flip-flop, and the down frequency detector signal is obtained by binary multiplication of the signal obtained at [a] the bar-output of the second flip-flop and a signal obtained at a bar-output of the third flip-flop signal obtained at the bar-output of the second flip-flop.